Math 2300, Spring 2019 – Discrete Structures
Material Covered Since Quiz 2
And Sample Problems

Please see review sheets for Quiz 1 and Quiz 2. The final exam is cumulative.

You may bring the PMI, PSMI, SOLHRRCC and SOLRRCC handouts. You may write on them in your own handwriting.

This is intended as a guide and not meant to exclude anything unless explicitly stated.

Solving Recurrences
 Iterate and guess (check by induction)
 Theorems (use to find formulas with numbered steps)
  SOLHRRCC – distinct roots
  SOLHRRCC – repeated roots
  SOLRRCC (non-homogeneous)

Some sample problems:

For 1-3 use the theorem on the handout (SOLRRCC).

1. $a_k = 4a_{k-1} - 9, \quad k \geq 1, \quad a_0 = 1$

2. $a_k = 4a_{k-1} - 4a_{k-2} + k, \quad k \geq 2, \quad a_0 = 5, a_1 = 9$

3. $a_k = 2a_{k-1} + 3a_{k-2} + 5^k, \quad k \geq 2, \quad a_0 = -2, a_1 = 1$

4. Let $A = \{1,2,3\}$ and $B = \{x,y\}$.
 a. List the elements of $A \times B$.
 b. List the elements of the power set of A: $\mathscr{P}(A)$.

5. Let A, B, and C be sets. Prove that $(A \times B) \cup (A \times C) \subseteq A \times (B \cup C)$.

6. Let A, B, and C be sets. Use set identities to prove that $(A - B) - C = A - (B \cup C)$.

7. Assume that all sets are subsets of a universal set U and prove that for all sets A and B, if $A \subseteq B$, then $A \cap B^c = \emptyset$.